Department of Agriculture, Trade and Consumer Protection
Division of Agricultural Development
Agricultural Development & Diversification Program (ADD)
Grant Project Final Report

Contract Number: 24053

Grant Project Title: Development of cut and peel carrot production systems for Wisconsin

Amount of Funding Awarded: $22,500

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Please focus on the Wisconsin Agricultural Industry as the primary audience for your grant project final report. The following questions are meant to be a guide for writing your grant project final report. Your final report will be shared with the Agricultural Industry and can serve as a template for further growth and development for the State of Wisconsin. Please provide them with the best report possible. If we can help in some way, please let us know.

1) What was the original intent of the grant? The goal of this project is to determine production and storage potential for cut and peel carrot in Wisconsin.
   - What did you want to accomplish with the grant?

1) Determine carrot flavor constituents when planted at different times during the growing season and harvested for cut and peel.
2) Quantify moisture loss, shrink, white mold development, and quality of cut and peel carrot when stored for up to 8 months.
3) Determine recovery of commercial scale cut and peel carrot samples from the field and from storage.

   - How was it expected to benefit Wisconsin Agriculture?

The benefit would be in creation of a new high value crop enterprise in cut and peel carrots. Two largest challenges facing Wisconsin in creation of cut and peel carrots is 12 month supply of raw product and making sure carrots have good flavor.

   - What steps did you take to reach your goal?

We conducted multiple field and storage research trials that evaluated multiple carrot varieties, planting dates, harvest dates, and storage conditions. We assayed different treatments implemented for effects on the flavor of carrots out of the field over the course of several months and during storage. We knew prior to conducting these research trials that carrots harvested directly from the field during the heat of summer were not as flavorful as carrots harvested in fall or from storage. We also conducted storage trials to determine the influence of storage on carrot flavor. We also wanted to optimize carrot storage to minimize losses and maintain quality for cut and peel out of storage.

   - What makes this project work important or significant to the State of Wisconsin or Wisconsin Agriculture?

Processing carrot were worth a little more than $1,300/a whereas cut and peel carrot were worth an estimate $6,500/a in 2006 (National Agricultural Statistics Service, 2006). Cut and peel carrot that is marketed 12 months per year would fit well with current market and distribution systems for onion and potato that already exist. Business opportunity for carrot producers and packing sheds.

2) What were you able to accomplish?
   - Please share any appropriate project results and other information beneficial to Wisconsin Agriculture.

This research accomplished the following:

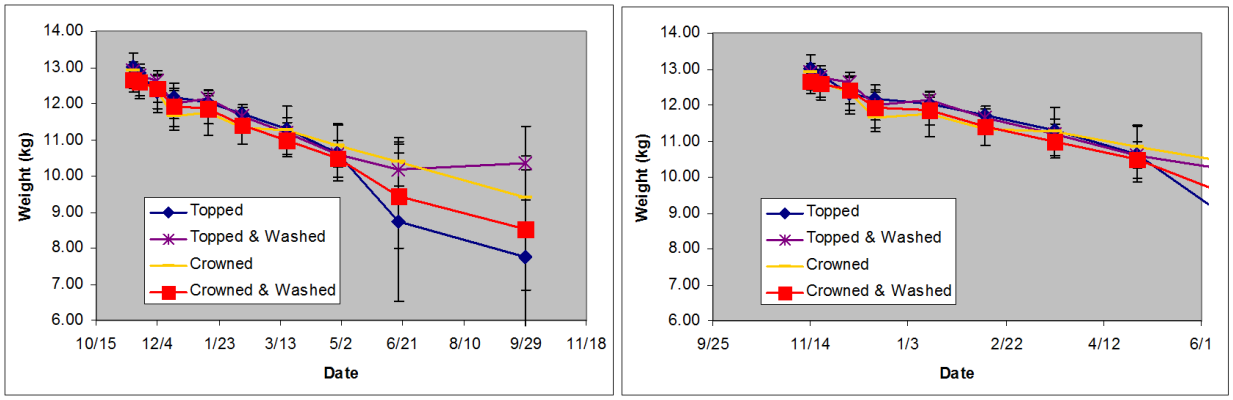
-identified carrots with improved flavor when harvested from the field.

-refrigerated storage for 20 to 30 days at 34 F can increase the sugar content and thus the sweetness and general flavor of carrots.

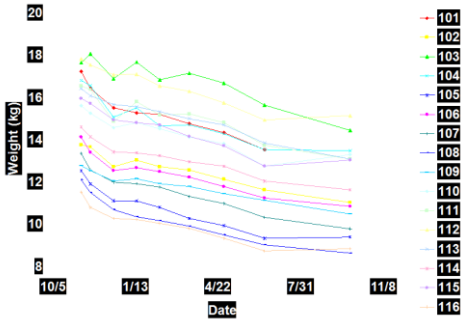
-we can store carrot until May or June and retain turgidity and quality

-we can produce 10 to 11 month supply of raw carrots for cut and peel!!!!

- Include any analysis of data collected or materials developed through project work.



Above data shows weight loss from initiation of storage until carrots were removed the following September. This was repeated over 4 different years. Little loss was observed through April and acceptable quality was still recovered through June. Once we got past June quality declined to unacceptable levels.



Data to the right shows differences in shrink of multiple carrot varieties. Slope was similar for many of the varieties suggesting many will store similarly if disease development can be avoided. Therefore, variety selection will be flavor and disease sensitivity dependent (primarily white mold sensitivity).

Several varieties have superior flavor and efforts continue to improve carrot flavor.

3) What conclusions can you make based on project work the analysis of collected data?
   -We can produce raw carrots for cut and peel processing 12 months per year.
   -Our production costs are lower than West Coast production regions due to lower land costs and lower freight costs to the Midwest and East
   -Storage costs are lower because we can use cold winter air to manage storage facility temperature
   -Raw product is not limiting our capacity to market cut and peel carrots
4) What do you plan to do in the future as a result of this project?
   -Efforts to breed for resistance to storage disease and flavor to produce improved varieties is underway with industry funding
   -large scale bulk storage. 30,000 cwt were stored successfully for processing in 2009
   -Develop market for Midwest cut and peel carrot. We are working with the WPVGA promotion committee to explore business opportunities.
5) What information or additional resources are needed to commercially develop this enterprise?
   -risk management assessment for cost of processing unit.
   -partnership with Bolthouse or Grimway to subcontract production and processing in the Midwest (this is the opinion of the packing houses
6) How should the agricultural industry use the results from your grant project?
   We have met with the WPVGA promotion committee to initiate business development plan rather than feasibility or research program. There is interest by multiple packaging facilities to move in this direction including those with ties to regional produce distribution centers.